MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

TCP1231 – COMPUTER PROGRAMMING I

(All sections / Groups)

26 MAY 2017
9:00 a.m – 11:00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 7 pages with 5 questions only.

2. Attempt **FOUR** out of FIVE questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Write your answers in the Answer Booklet provided.

Question 1 [10 Marks]

As a senior programmer, you have been asked by your supervisor to develop a travelling allowance claims program for the company. The program takes the starting mileage, ending mileage and rate (sen per km) as input and calculates the current travelling cost. Then, it prompts the user to either key in the next claim or stop. If the user does not wish to continue, the total allowance and mileage are displayed.

Sample Output

```
Enter start mileage : 13256
Enter end mileage : 13281
Enter rate (sen/km): 0.65

Mileage : 25
Allowance : RM 16.25

Do you want to enter another claim? (Y/N) : Y

Enter start mileage : 25886
Enter end mileage : 25992
Enter price/mileage: 0.55

Mileage : 106
Allowance : RM 58.3

Do you want to enter another claim? (Y/N) : N

TOTAL MILEAGE : 131
TOTAL ALLOWANCE : RM 74.55
```

a) Complete the flowchart in Figure 1 for the program above. [5 Marks]

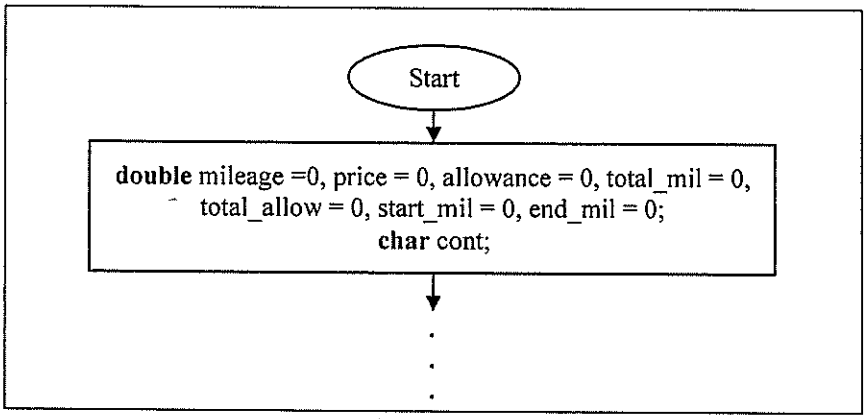

Figure 1

b) Write a complete C++ program. [5 Marks]

Continued...

Question 2 **[10 Marks]**

a) Identify the output of the following C++ program.

i) [1 Mark]

```
int i = 0;
do{
    cout << ++i << endl;
}while (i<5);
```

ii) [1 Mark]

```
int x = 23, y = 5;
int z;
cout << x % y;
```

iii) [1 Mark]

```
int j = 15;
for (int i = 4; i < (j*2) ; i*=2){
    cout << i << " ";
}
```

iv) [2 Marks]

```
void compute(int &a, int *b, int c)
{
    a += 1;
    c *= 2;
    *b = a + c;
    cout << a << " " << *b << " " << c << endl;
}

int main()
{
    int x = 6, y = 9, z = 4;
    compute(x,&y,z);
    cout << x << " " << y << " " << z << endl;
    return 0;
}
```

v) [1 Mark]

```
int a[6] = {2,5,7,4,3};
cout << a[1] << " " << a[2] << " " << a[a[1]];
```

b) What is the difference between while and do-while loops? [2 Marks]

c) Each of the code segments below has a compile error. Identify and correct the compile errors.

i) [1 Mark]

```
int a = 5;
for (i = 0; i < a; i++){
    cout << i + 1 << "\n";
}
```

ii) [1 Mark]

```
string notes;
cout << "Enter your notes : ";
getline(notes);
cout << notes;
```

Continued...

Question 3 [10 Marks]

a) Given the `main()` function and the sample output as shown below:

```
int main(){
    const int arraySize = 5;
    int a[arraySize] = {2,3,4,5,6};

    cout << "Original array : ";
    displayArray(a, arraySize);

    multiplyArray(a, arraySize);
    cout << "Multiplied array : ";

    displayArray(a, arraySize);
    return 0;
}
```

Sample Output

```
Original array : 2   3   4   5   6
Multiplied array : 4   6   8   10   12
```

i) Write the function `displayArray()` which displays all elements in the array on the screen. [2 Marks]

ii) Write the function `multiplyArray()` function which multiplies the original array by a scalar value of 2. [2 Marks]

b) Given the class `course` with its member variable and functions as shown below:

```
class course{
    private:
        string courseName;
    public:
        void setCourseName(string);
        string getCourseName();
};
```

i) Complete the member function of class `setCourseName()` that sets the variable `courseName` according to the value of the argument. [1 Mark]

ii) Complete the member function of class `getCourseName()` that returns the value of the course name. [1 Mark]

iii) Complete the `main()` function below that declare a `course` object and name it as `ITcourse`. Set the course name by using class function `setCourseName()`, then display the course name using `getCourseName()`. [2 Marks]

Continued...

```
int main(){
    string subjectName = "Computer Programming I";

    // Write your code in your answer booklet.

    return 0;
}
```

Sample Output

```
The course subject is Computer Programming I
```

c) Both arrays and structures are classified as structured data types as they provide mechanisms to access data in an easy manner. However, they are different in a number of ways. Provide **ONE (1)** difference between arrays and structures.

[2 Marks]

Question 4 **[10 Marks]**

a) A program stores a number of employees' working hours and hourly pay rate in two different vectors. The gross payment is then calculated and displayed. Complete the following C++ program with appropriate statements based on the comments given. [5 Marks]

```
#include <iostream>
#include <vector>
#include <iomanip>

using namespace std;

int main(){
    // declare vectors 'hours' and 'payRate'
    // Write your codes in the answer booklet
    int num_emp, hours_worked;
    double pay_rate, gross_pay;

    cout << "Enter number of employee : ";
    cin >> num_emp;

    for (int i = 0; i < num_emp; i++){
        cout << "Employee #" << i+1 << endl;

        // prompt user for hours worked and pay rate,
        // then store the value in the vectors
        // Write your codes in the answer booklet

        cout << endl;
    }
    cout << fixed << showpoint << setprecision(2);
    cout << "Gross Payment : " << endl;
```

Continued...

```
    for (int i = 0; i < num_emp; i++){

        // Calculate the gross pay and display on the screen
        // Write your codes in the answer booklet
    }
    return 0;
}
```

Sample Output

```
Enter number of employees : 3
Employee #1:
Hours worked : 40
Hourly pay rate : 15.2

Employee #2:
Hours worked : 25
Hourly pay rate : 18.5


Employee #3:
Hours worked : 30
Hourly pay rate : 11.3

Gross payment :
Employee #1 : RM 608.00
Employee #2 : RM 462.50
Employee #3 : RM 339.00
```

b) Complete the following C++ program to display the output as shown below: [3 Marks]

```
int main(){
    int x = 35;
    int *ptr;
    ptr = &x;

    // Write your codes in the answer booklet.

    return 0;
}
```

Sample Output

```
The value in x is 35
The value in pointer is 35
The address of x in pointer is 0x6ffe34
```

c) Explain what dynamic array is. [2 Marks]

Continued...

Question 5 [10 Marks]

a) Write a C++ statement that deletes a dynamic array `a`. [1 Mark]

b) Complete the following C++ program that prompts the user for the size of an array. After that, it calls a function `getNum()` that prompts the user to fill with integers values until the entire array is filled. Finally, a function `totalNum()` is called to sum up all the integers in the array and the total value is returned to the `main()` function. [6 Marks]

```
#include <iostream>
using namespace std;

int main(){
int SIZE;
cout << "Enter size of array : ";
cin >> SIZE;
int numArr[SIZE];

// Write your codes in the answer booklet.

return 0;
}
```

Sample Output

```
Enter size of array : 4
Enter number #1 : 12
Enter number #2 : 15
Enter number #3 : 7
Enter number #4 : 19
The total is 53
```

Continued...

c) Locate the error(s) below and provide the line number and correction(s) needed. [3 Marks]

Line number	C++ Code
1	`#include <iostream>`
2	`#include <iofstream>`
3	`using namespace std;`
4	
5	`int main(){`
6	`    ifstream in_stream;`
7	`    ofstream out_stream;`
8	`    int x, y;`
9	
10	`    in_stream.open("infile.txt");`
11	`    out_stream.open("outfile.txt");`
12	
13	`    if(in_stream && out_stream == good()){`
14	`        infile.txt >> x >> y;`
15	`        out_stream << "The first two numbers are "`
16	`            << x <<  " and " << y << endl;`
17	`    }else{`
18	`        cout << "ERROR opening files!";`
19	`    }`
20	`    in_stream.close();`
	`    out_stream.close();`
	`    return 0;`
	`}`

End of Paper.